

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Expanding the Economic and Innovation)	GN Docket No. 12-268
Opportunities of Spectrum Through)	
Incentive Auctions)	

REPLY COMMENTS OF SPRINT NEXTEL CORPORATION

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Exhibit: *Why Restricting Participation in Spectrum Auctions Can Increase Bidder Participation, Increase Auction Revenues, and Increase Competition in Wireless Markets*, Stanley M. Besen, Serge X. Moresi and Steven C. Salop, Charles River Associates

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I. INTRODUCTION AND SUMMARY

Sprint Nextel Corporation (“Sprint”) respectfully submits its Reply Comments in response to the Notice of Proposed Rulemaking (“NPRM”) in the above-captioned proceeding.¹ The record in this proceeding reflects widespread consensus that the Commission can successfully unleash additional spectrum for mobile broadband while protecting remaining television broadcast services.

At the same time, the Commission should carefully consider a number of issues raised by commenters in this proceeding. Most notably, these include ensuring that the incentive auction promotes competitive access to spectrum below 1 GHz, repacking the spectrum to minimize the potential for harmful interference between adjacent services, and adopting a band plan that maximizes the amount of bi-directional spectrum available to the greatest number of competitors. By focusing on these core objectives, the Commission will promote participation in both the reverse and forward auctions (and as a consequence, clear more spectrum while raising

¹ *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, GN Docket No. 12-268 (rel. Oct. 2, 2012) (“NPRM”).

more revenue), promote competition in the market for mobile broadband services, and provide the funding necessary for the Nationwide Public Safety Broadband Network (“NPSBN”).

The importance of the Commission’s selected band plan cannot be emphasized enough. As the Commission notes in the NPRM, “The forward auction’s interdependence with the reverse auction and the repacking mean that we will not know in advance the amount of spectrum we can make available in the forward auction, the specific frequencies that will be available and, perhaps, the geographical locations of such frequencies.”² As a result, the band plan must be “flexible enough to accommodate varying amounts of spectrum” and “provide as much information and certainty as possible.”³ The incentive auctions hinge in large part on the success of the repacking and band plan connecting the reverse and forward auctions.

Sprint has carefully examined the comments submitted – including alternative band plan proposals – and continues to believe that a time-division duplex (“TDD”) band plan offers the Commission the best path to achieving these objectives. As Sprint emphasized in its Comments, the Commission’s optimal band plan must: 1) maximize the amount of spectrum that can be auctioned for commercial use by multiple competitors; 2) stimulate sufficient auction revenues to support the important public policy goals of the Spectrum Act; 3) provide reasonable protection from interference to services that will continue to operate in neighboring spectrum; 4) promote scale and interoperability, while avoiding the creation of band segments that are disadvantaged because of neighboring uses; 5) minimize the amount of spectrum that must be put to restricted

² *Id.* at ¶ 123.

³ *Id.* at ¶ 124.

use (such as guard bands and duplex gaps); and 6) provide a scalable approach that, if necessary, can work when the same amount of cleared spectrum is not available in all markets.⁴

In addition to the critical importance of the Commission's band plan, Sprint also notes widespread agreement on the importance of ensuring competitive access to low-band spectrum. In particular, myriad commenters emphasized the enormous competitive impact of spectrum below 1 GHz – and the extent to which two operators, AT&T and Verizon, have successfully aggregated this spectrum to the exclusion of competitors. In light of the significant value of low-band spectrum to geographic coverage, in-building penetration and network cost structure, *i.e.*, to robust long-term competition, Sprint urges the Commission to exercise its statutory authority to design the auction to promote competitive entry to 600 MHz spectrum and prevent further concentration – already excessive – of spectrum below 1 GHz.

II. THERE IS STRONG SUPPORT IN THE RECORD FOR ADOPTING PRO-COMPETITIVE POLICIES TO PROMOTE WIDESPREAD AUCTION PARTICIPATION AND PREVENT CONTINUED CONCENTRATION OF SPECTRUM BELOW 1 GHZ

In its comments in this proceeding, Sprint urged the Commission to exercise its statutory authority to ensure that the forward auction promotes wireless broadband competition. Specifically, to prevent further concentration of spectrum below 1 GHz, Sprint encouraged the Commission to modify its spectrum holdings policies to include a cap on spectrum holdings below 1 GHz,⁵ as well as potential adoption of eligibility criteria and bidding rules for the forward auction that would prevent the last remaining low-band spectrum from being parceled

⁴ Comments of Sprint Nextel Corporation, GN Docket No. 12-268, at 17 (filed Jan. 25, 2013) (“Sprint Comments”).

⁵ Sprint Comments, at 3.

out solely between the two operators with the vast majority of current low-band holdings.⁶ The record only magnifies the necessity for such action.

A. The Record Supports Commission Action to Recognize the Critical Competitive Importance of Spectrum Below 1 GHz

The Commission has on numerous occasions acknowledged the unique characteristics of spectrum below 1 GHz, and the importance of low-band spectrum to an operator's spectrum portfolio.⁷ As Sprint emphasized in its Comments in the above-captioned proceeding, as well as in the Commission's parallel Mobile Spectrum Holdings proceeding, it is crucial that the Commission's spectrum policies – and most notably its spectrum screen – reflect this importance.⁸ As the only remaining spectrum below 1 GHz, the 600 MHz band presents the last opportunity for competitive operators to acquire low-band spectrum to effectively compete against AT&T and Verizon.

Numerous commenters similarly urge the Commission to modify its spectrum policies to capture the competitive importance of sub-1 GHz spectrum. The Competitive Carriers Association ("CCA") notes that sub-1 GHz spectrum "can provide the same geographic coverage at lower costs than higher frequency bands." The propagation characteristics of this spectrum,

⁶ Sprint Comments, at 7.

⁷ See, e.g., *Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Fifteenth Report, 26 FCC Rcd 9664, ¶ 307 (2011) ("*Fifteenth Competition Report*") ("[G]iven the superior propagation characteristics of spectrum under 1 GHz, particularly for providing coverage in rural areas and for penetrating buildings, providers whose spectrum assets include a greater amount of spectrum below 1 GHz spectrum may possess certain competitive advantages for providing robust coverage when compared to licensees whose portfolio is exclusively or primarily comprised of higher frequency spectrum. As discussed above, holding a mix of frequency ranges may be optimal from the perspective of providing the greatest service quality at low cost."); *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Fourteenth Report, 25 FCC Rcd 11407, ¶ 283 (2010) ("*Fourteenth Competition Report*"); *Application of AT&T Inc. and Qualcomm Inc.*, Order, 26 FCC Rcd 17589, ¶ 49 (2011) ("*AT&T-Qualcomm Order*").

⁸ Sprint Comments, at 3; Comments of Sprint Nextel Corporation, WT Docket No. 12-269, at 6-7 (filed Nov. 28, 2012); Reply Comments of Sprint Nextel Corporation, WT Docket No. 12-269, at 14-15 (filed Jan. 7, 2013).

CCA argues, make it particularly critical for operators wishing to more effectively compete against the nation’s two “super-carriers.”⁹ C Spire Wireless echoes these concerns, noting that as “low band spectrum has become further concentrated in the hands of the largest operators,” competitors and new entrants have been forced “to undertake more costly network deployments utilizing higher band spectrum – generally, spectrum above 1 GHz – which has less robust propagation characteristics.”¹⁰ The advantages of low-band spectrum and the critical need for operators to have a meaningful opportunity to acquire such spectrum are “particularly acute in the context of the 600 MHz spectrum.”¹¹ These sentiments are echoed by a wide array of commenters, calling for adoption of a mix of sub-1 GHz spectrum caps, band-weightings within the spectrum screen, and eligibility limits within the forward auction to prevent further concentration.¹²

Not surprisingly, AT&T and Verizon oppose attempts to recognize the competitive importance of spectrum below 1 GHz. AT&T, for instance, argues that “if a winning bidder’s

⁹ Comments of the Competitive Carriers Association, GN Docket No. 12-268, at 7 (filed Jan. 25, 2013) (“CCA Comments”).

¹⁰ Comments of Cellular South, Inc. (d/b/a C Spire Wireless), GN Docket No. 12-268, at 5 (filed Jan. 25, 2013) (“C Spire Comments”).

¹¹ C Spire Comments, at 2.

¹² See, e.g., Comments of Free Press, GN Docket No. 12-268, at 14 (filed Jan. 25, 2013) (calling on the Commission to adopt rules of general applicability “to ensure that no one carrier captures a disproportionate amount of auctioned spectrum in this or any future proceeding”); Comments of Leap Wireless International, Inc. and Cricket Communications, Inc., GN Docket No. 12-268, at 7-8 (filed Jan. 25, 2013) (urging the Commission, prior to conducting the incentive auction, to “revise its screen to account for differences among spectrum bands with respect to propagation characteristics and device ecosystems, which make particular bands more or less valuable for deploying mobile broadband services”) (“Leap Comments”); Comments of Public Interest Spectrum Coalition, GN Docket No. 12-268, at 63, 68 (filed Jan. 25, 2013) (advocating the imposition of an “auction-specific screen” or cap for spectrum below 1 GHz that incorporates a “weighted approach that factors the greater value of spectrum holdings below 1 GHz into the overall screen.”); Comments of T-Mobile USA, Inc., GN Docket No. 12-268, at 23-31 (filed Jan. 25, 2013) (“T-Mobile Comments”) (encouraging the Commission to adopt and apply a cap on spectrum below 1 GHz to determine eligibility in the forward auction); Comments of United States Cellular Corporation, GN Docket No. 12-268, at 30 (filed Jan. 25, 2013) (proposing adoption of an “auction-specific spectrum aggregation limit” to prevent any one applicant from acquiring more than a certain amount of 600 MHz spectrum in a single market).

acquisition of new spectrum would bring its total holdings in a market to a level that is determined to threaten competition, that licensee should be free to choose which spectrum it will divest to remedy the perceived anticompetitive harm.”¹³ In other words, if AT&T acquired an amount of 600 MHz that caused it to exceed the spectrum screen in a defined market, it should be free to divest, for instance, WCS or other higher frequency less valuable (and likely less useful) spectrum to rectify any competitive harms.¹⁴ Verizon similarly dismisses the competitive significance of low-band spectrum, arguing that the wireless broadband market is marked by “strong and increasing competition,” which obviates the possibility of that “competitive harm would develop for services provided using 600 MHz spectrum.”¹⁵

Notably, neither AT&T nor Verizon attempts to directly address the claims of a wide range of commenters that spectrum below 1 GHz – and notably the auction of spectrum in the 600 MHz band – has competitive significance, distinguishing it from other bands. Indeed, it would be difficult for AT&T and Verizon to dispute the clear advantages that their dominating share of low-band spectrum confer: as the Commission noted in the context of the *AT&T-Qualcomm Order*, AT&T readily acknowledged the significant difference between low- and high-band spectrum in the context of its bid to acquire T-Mobile, “where it asserted that a significant benefit to T-Mobile customers would be their newly acquired access to AT&T

¹³ Comments of AT&T Inc., GN Docket No. 12-268, at 13 (filed Jan. 25, 2013) (“AT&T Comments”).

¹⁴ As explained in the attached exhibit by outside economists, post-auction divestitures like those proposed by AT&T not only create strong incentives for a firm to “divest spectrum that would have the least value to its rivals,” but also, absent strict oversight by a regulator, invite the firm divesting assets to “price them above their market value or engage in negotiating tactics that delay access to spectrum by its competitors.” See attached exhibit: Stanley M. Besen, Serge X. Moresi, and Steven C. Salop, Charles River Associates, *Why Restricting Participation in Spectrum Auctions Can Increase Bidder Participation, Increase Auction Revenues, and Increase Competition in Wireless Markets*, at 9 (March 13, 2013) (“Economic Exhibit”).

¹⁵ Comments of Verizon and Verizon Wireless, GN Docket No. 12-268, at 40 (filed Jan. 25, 2013) (“Verizon Comments”).

spectrum below 1 GHz, enabling those customers to receive both extended rural coverage and ‘superior in-building and in-home service’ due to access to AT&T’s spectrum below 1 GHz.”¹⁶ Nor is Verizon in any position to dispute these critical competitive differences. As Verizon Chief Financial Officer and Executive Vice President Fran Shammo observed, “[A]t 700 MHz, the building penetration is phenomenal. So we believe it is a competitive advantage there.”¹⁷ Shammo likewise noted that, “We have the 700 MHz contiguous across the United States, which puts us in a different realm than some other carriers.”¹⁸ Verizon’s recent commercials similarly boast of the in-building penetration and extensive geographic reach of the 700 MHz spectrum it uses to support its 4G LTE service.¹⁹

B. To Promote Effective Competition for Mobile Broadband Services and Prevent Excessive Concentration of Low-Band Licenses, the Commission Should Adopt Eligibility Restrictions in the 600 MHz Auction

The Commission’s ability to reverse the concentration of spectrum below 1 GHz that has occurred since the first assignment of 850 MHz cellular licenses (and most dramatically in the last decade through consolidation) is limited as a practical matter. Specifically, in its Mobile Spectrum Holdings NPRM, the Commission indicated that it does “not anticipate revisiting licensees’ current spectrum holdings under any revised policy for below 1 GHz spectrum, but

¹⁶ *AT&T-Qualcomm Order*, at ¶ 49. *See also* Ralph de la Vega, President and CEO, AT&T Mobility, AT&T’s First Quarter 2012 Earnings Call, FD (FAIR DISCLOSURE) WIRE (April 24, 2012) (“[W]e prefer low band spectrum.”); Peter Ritcher, Senior Vice President and Wireless Chief Financial Officer, AT&T, AT&T at Credit Suisse Group Convergence Conference, FD (FAIR DISCLOSURE) WIRE (March 9, 2011) (“[L]ow-frequency spectrum obviously [has] much better sort of in-building penetration, much better build characteristics with that kind of spectrum.”).

¹⁷ Fran Shammo, Chief Financial Officer and Executive Vice President, Verizon, Verizon Communications Inc. at Oppenheimer & Co. Technology & Communications Conference, FD (FAIR DISCLOSURE) WIRE (Aug. 10, 2011).

¹⁸ Fran Shammo, Chief Financial Officer and Executive Vice President, Verizon, Verizon at Morgan Stanley Technology, Media & Telecom Conference, FD (FAIR DISCLOSURE) WIRE (March 1, 2011).

¹⁹ Verizon Wireless, “Verizon 4G LTE – ‘Hiking’ Commercial,” (Feb. 19, 2013), *available at* <http://www.youtube.com/watch?v=qWADLGvIi6w>

instead would grandfather those holdings.”²⁰ That being the case, the importance of prospective Commission action to promote greater diversity of sub-1 GHz spectrum licensing comes into sharper focus. Specifically, as Sprint and numerous commenters have argued, the Commission should utilize its statutory authority under section 309(j)(3)(B) and adopt rules of general applicability in the form of eligibility criteria and bidding rules.²¹

The Commission notes that section 309(j)(3)(B) directs the Commission to “promot[e] economic opportunity and competition and ensur[e] that new and innovation technologies are readily accessible to the American people by avoiding excessive concentration of licenses.”²² No greater justification for exercise of this authority can be conceived. As demonstrated above, Verizon and AT&T both readily acknowledge in other venues that low-band spectrum is critical to a carrier’s ability to provide robust technologies and services to consumers, impacting the competitive market for mobile broadband.²³ Currently, only AT&T and Verizon, with their dominating possession of commercial spectrum below 1 GHz, have this ability. The 600 MHz auction can have a profound and pro-competitive impact on consumers, prices, and innovation with properly-crafted rules to ensure competitive carriers have a viable ability to acquire similar low-band spectrum.

²⁰ *Policies Regarding Mobile Spectrum Holdings*, Notice of Proposed Rulemaking, WT Docket No. 12-269, at ¶ 36 (rel. Sept. 28, 2012).

²¹ See Sprint Comments, at 9; CCA Comments, at 9; C Spire Comments, at 5; Free Press Comments, at 13; PISC Comments, at 63-64; T-Mobile Comments, at 23, 27-30; U.S. Cellular Comments, at 30 (while purporting to advocate ‘open eligibility,’ U.S. Cellular nonetheless argues that the Commission should impose an intra-auction limit on a bidder’s eligibility to acquire more than a specified percentage of 600 MHz spectrum in a single market).

²² NPRM, at ¶ 383 (citing 47 U.S.C. § 309(j)(3)(B)).

²³ *Id.*, supra notes 16, 17, 18, and 19.

The comments of AT&T and Verizon offer significant cause for concern. Specifically, the band plans of AT&T and Verizon conveniently feature 25 MHz and 20 MHz blocks for paired spectrum, respectively – as a practical matter likely allowing two carriers at most to acquire paired 2x10 MHz blocks.²⁴ These band plans lend themselves to equitable partitioning between two operators, resulting in the potential scenario of AT&T and Verizon winning the lion’s share of 600 MHz spectrum, with limited (if any) meaningful 600 MHz entry by other carriers (unless, contrary to AT&T and Verizon’s protestations, the Commission adopts eligibility restrictions). By contrast, Sprint and T-Mobile offered band plans with robust competitive opportunities for at least three operators, if not more.²⁵

With the incentive auctions projected to free up significantly less than the full initially projected 120 MHz, particularly in the most congested (and highest-value) markets, the Commission must ensure that operators currently bereft of low-band spectrum have a viable opportunity to acquire 600 MHz licenses. As Sprint emphasized in its Comments, the Commission should consider this circumstance and adopt eligibility rules to prevent further concentration within the 600 MHz band. The precise methodology of these rules may change depending on the Commission’s selected band plan (for instance, whether the Commission elects an FDD, TDD, technology neutral, or combination band plan) and the amount of spectrum that becomes available for mobile broadband in particular markets. Sprint does not advocate the Commission taking the formulation of such auction rules lightly; indeed, Sprint believes that the

²⁴ AT&T Comments, at 32; Verizon Comments, at 11. While Verizon offers a band plan ostensibly providing both significant uplink and downlink spectrum in the unlikely scenario that the maximum amount of spectrum – 120 MHz – is cleared, it seems highly likely (based on past behavior and its comments on the need for two duplexers to support this band plan) that even in this improbable scenario the two dominant carriers will find a way to disadvantage and otherwise prevent entry or limit interoperability for competing operators.

²⁵ Sprint Comments, at 22; T-Mobile Comments, at 10, 12.

Commission should carefully tailor any eligibility restrictions or set-asides to the current competitive landscape and the specifics of the 600 MHz band. The ultimate objective of such rules, however, should be to ensure that multiple operators have a meaningful ability to acquire low-band spectrum, expanding the economic and innovation opportunities associated with low-band spectrum to a larger range of competitors.

A small and predictable cadre of commenters allege that adoption of eligibility restrictions will have a dampening effect on participation and auction revenue – with Verizon going so far as to assert that such rules “threaten outright auction failure.”²⁶ Under this view, any limitation on the ability of a bidder, however dominant its holdings of spectrum below 1 GHz, will deter participation by AT&T and Verizon, depressing revenues and threatening the ability to fund the NPSBN. As the attached exhibit by outside economists makes clear, however, economic theory and experiences in previous spectrum auctions demonstrate that well-designed bidding restrictions (including set-asides and spectrum caps) often *improve* auction competitiveness and the resultant auction outcome.²⁷ Properly crafted eligibility restrictions could increase auction revenue, and have done so in the past, by broadening auction participation by bidders otherwise deterred by the heightened prospect in an open auction that dominant incumbents, attaching a foreclosure value above any competitor’s willingness to pay, will always win.²⁸

²⁶ AT&T Comments, at 13; *See also* Verizon Comments, at 41-42; Comments of Consumer Electronics Association, GN Docket No. 12-268, at 14 (filed Jan. 25, 2013); Comments of Telecommunications Industry Association, GN Docket No. 12-268, at 16-17 (filed Jan. 25, 2013).

²⁷ Economic Exhibit at 6.

²⁸ Economic Exhibit, at 5-6.

Sprint notes that AT&T and Verizon have an incentive to engage in bidding strategies to deter prospective entrants at 600 MHz. Through various means dominant carriers have in other auctions indicated their intention to acquire as much spectrum as possible, at whatever price forecloses competitive entry. That can successfully deter participation by new potential auction entrants.²⁹ *As a consequence, such incumbents can actually acquire spectrum at values **below** those their competitors would otherwise have paid if provided sufficient confidence in having a meaningful opportunity to win.*³⁰ In other words, *open* eligibility, without even modest eligibility restrictions or set-asides, can diminish auction participation and overall revenue. The relevant question, then, is which poses the greater prospect of diminishing participation: open eligibility, in which the dominant holders of sub-1 GHz spectrum can signal to potential bidders that they

²⁹ Peter Cramton, Evan Kwerel, Gregory Rosston, and Andrzej Skrzypacz, “Using Spectrum Auctions to Enhance Competition in Wireless Services,” at S169, *Journal of Law & Economics* (November 2011) (“[P]art of the willingness to pay for the incumbent in the auction comes from the value of deterring new entry, which is bad for overall efficiency for the standard market power reasons and may be bad for the dynamic evolution of the service if the threat of competition is necessary to speed up the build out and development of new technologies...[T]he expectation that incumbents are likely to have some synergy value for new spectrum and have additional incentives to bid aggressively in the auction to deter entry is often a strong deterrent for potential new bidders.”); Peter Cramton, Andrzej Skrzypacz, and Robert Wilson, “Summary: Revenues in the 700 MHz Spectrum Auction,” at 1, 6 (June 27, 2007) (attached to Letter from Gerard J. Waldron, Counsel to Frontline Wireless, LCC, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket Nos. 96-86, 06-150, 06-169, PS Docket No. 06-229 (filed June 28, 2007)) (alleging that AT&T repeatedly engaged in “predation to deter entry” and arguing that “The high foreclosure value to Verizon and AT&T deters new entrants from participating in the auction, reducing bidder competition and driving down auction revenues. New entrants rationally stay away from an auction when the costs of participating outweigh the expected profits...Participation is discouraged and the absence of new competitors allows incumbents to win licenses at very low prices.”); Gregory Rose, “Spectrum Auction Breakdown: How Incumbents Manipulate the FCC Auction Rules to Block Broadband Competition,” at 1-2, New America Foundation Working Paper (June 2007) *available at* http://www.newamerica.net/files/nafmigration/WorkingPaper18_FCCAuctionRules_Rose_FINAL.pdf (identifying a number of blocking, signaling and retaliatory bidding strategies employed to deter entry and concluding that “Both the blocking and retaliatory bidding strategies evidenced in the AWS-1 auction limited competition, adversely affected new entrants and most likely reduced total auction revenue.”).

³⁰ Paul Klemperer, “Using and Abusing Economic Theory,” at 10 (Feb. 2003), *available at* <http://www.nuff.ox.ac.uk/users/klemperer/usingandabusing.pdf> (“[T]he profitability of an auction depends crucially on the number of bidders who participate, and different auctions vary enormously in their attractiveness to entry; participating in an auction can be a costly exercise that bidders will only undertake if they feel they have realistic chances of winning. In an ascending auction a stronger bidder can always top any bid that a weaker bidder makes, and knowing this the weaker bidder may not enter the auction in the first place – which may then allow the stronger bidder to win at a very low price.”).

will outbid any competitive entrants in order to foreclose competitive entrants' ability to obtain low-band spectrum, or an auction designed with carefully tailored eligibility restrictions or set-asides, permitting participation by dominant holders of sub-1 GHz spectrum, but preventing them from extending their anti-competitive concentration of low-band spectrum? Given the posturing of AT&T and Verizon, it seems clear that this participation-deterrence has already begun: already possessing 75% of sub-1 GHz spectrum – and 80% in the top 50 markets – the two operators have ostensibly signaled that if they can't win as much 600 MHz spectrum as they desire (foreclosing competitive entry), they'll sit out the auction out entirely. With their existing ample holdings of sub-1 GHz spectrum, Verizon and AT&T would seemingly need little additional low-band spectrum to complement their spectrum portfolios.³¹ Their desire for open eligibility can thus be interpreted as a signal to competing bidders that they have no intention of acquiring a modest amount of 600 MHz spectrum (such as that permitted by potential eligibility restrictions or set-asides). Instead, consistent with the foreclosure value they attach to the spectrum, they have signaled that they intend to acquire as much 600 MHz spectrum as possible,

³¹ Possible assertions that AT&T and Verizon desire 600 MHz spectrum to satisfy their overall spectrum demand needs (satisfying the network demands of their large customer base) ignore previous advocacy by AT&T and Verizon that low-band spectrum is ill-suited to provided extra network capacity. Rather, as AT&T and Verizon have claimed, higher frequency spectrum is better suited to adding network capacity. *See* Comments of AT&T Inc., WT Docket No. 12-269, at 68 (filed Nov. 28, 2012) (“The superior propagation characteristics of low-band spectrum become a disadvantage once a provider turns to densification, because signals from the base station in a low-band deployment are much more likely to create ‘noise’ and interference with other base stations.”); Reply Comments of AT&T Inc., WT Docket No. 12-269, at 26 (filed Jan. 7, 2013) (“Providers also will often prefer high-band spectrum in urban areas where cell sites tend to be smaller to help minimize inter-cell interference and to achieve the maximum benefits of technologies, such as MIMO, that enhance throughput and capacity.”); Comments of Verizon Wireless, WT Docket No. 12-269, at 29 (filed Nov. 28, 2012) (“In general, however, higher bands provide greater capacity, while lower bands offer greater propagation.”); Reply of Verizon Wireless, WT Docket No. 12-269, at 22-23 (filed Jan. 7, 2013) (“[H]igher band spectrum offers significant capacity advantages over lower band spectrum that can offset the propagation advantages of lower band spectrum...The limited signal propagation at higher frequencies facilitates ‘dense deployment with reduced risk of harmful interference to geographically or spectrally adjacent users, greatly increasing frequency reuse and available network capacity.’”). Thus, the auction of up to 65 MHz of higher frequency spectrum by 2015, as mandated by the Spectrum Act, would seem to provide the most desirable spectrum for AT&T and Verizon’s capacity needs.

thereby discouraging other smaller bidders from even attempting to compete for 600 MHz low-band spectrum licenses that are critical to competitors' ability to compete.

III. REPACKING AND BAND PLAN

The Commission must make a number of important decisions outside of auction design. Most notably, the Commission must establish appropriate mechanisms for repacking 600 MHz spectrum, and select a band plan that meets its “key policy goals” of “utility, certainty, interchangeability, quantity, and interoperability.”³² While the record reflects diverse views on repacking methodology and the ideal band plan, commenters largely agree that the most effective repacking involves the creation of a contiguous wireless allocation. Similarly, though proposing different methods of achieving it, commenters widely encourage the Commission to select a band plan that maximizes the amount of spectrum available for both uplink and downlink traffic.

A. Widespread Support Exists for the Creation of a Contiguous Allocation

The Commission's lead band plan proposes to locate remaining television stations within the duplex gap, interleaving the repacked band with broadcast and wireless broadband allocations.³³ While a noble effort in attempting to minimize the amount of broadcast spectrum necessary for a wireless broadband allocation in the 600 MHz band, commenters widely agree that the Commission should repack the 600 MHz band to create a contiguous allocation for wireless broadband. The placement of broadcast stations between wireless broadband allocations would unnecessarily create the threat of harmful interference from intermodulation products, undermining not only the certainty of forward auction bidders but, as Alcatel-Lucent

³² NPRM, at ¶ 125.

³³ *Id.* at ¶ 153-154.

argues, the interchangeability of the blocks by causing harmful interference to specific wireless broadband blocks.³⁴ This view is held by wireless carriers,³⁵ broadcasters,³⁶ and equipment manufacturers.³⁷ As Sprint and numerous commenters have argued, the Commission should focus its repacking efforts down from Channel 51 – potentially creating a contiguous allocation for wireless broadband between Channels 37 and 51.

B. The Commission Should Continue to Focus on Assigning the Most Spectrum to the Greatest Number of Operators

Another area of widespread agreement among commenters is an emphasis on assigning the most spectrum to the greatest number of operators. Specifically, numerous commenters urged the Commission to focus on auctioning spectrum capable of carrying both uplink and downlink traffic, rather than relegating spectrum to supplemental downlink.³⁸ As Sprint noted in its Comments, supplemental downlink spectrum provides value only to operators possessing

³⁴ Comments of Alcatel-Lucent, GN Docket No. 12-268, at 14, 16 (filed Jan. 25, 2013) (“Alcatel-Lucent Comments”).

³⁵ See AT&T Comments, at 24; T-Mobile Comments, at 8; Verizon Comments, at 5-6; Sprint Comments, at 22.

³⁶ See Comments of ABC Television Affiliates Association, CBS Television Network Affiliations Association, FBC Television Affiliates Association, and NBC Television Affiliates, GN Docket No. 12-268, at 43 (filed Jan. 25, 2013); Comments of Comcast Corporation and NBCUniversal Media, LLC, GN Docket No. 12-268, at 20 (filed Jan. 25, 2013); Comments of the National Association of Broadcasters, GN Docket No. 12-268, at 33-34 (filed Jan. 25, 2013) (“NAB Comments”).

³⁷ See Comments of Motorola Mobility LLC, GN Docket No. 12-268, at 10 (filed Jan. 25, 2013) (“Motorola Comments”); Comments of Nokia Siemens Networks US LLC, GN Docket No. 12-268, at 11 (filed Jan. 25, 2013) (“Nokia Siemens Networks Comments”); Comments of Qualcomm Incorporated, GN Docket No. 12-268, at n. 28 (filed Jan. 25, 2013) (“Qualcomm Comments”); Comments of Harris Corporation, GN Docket No. 12-268, at 25 (filed Jan. 25, 2013).

³⁸ For instance, see T-Mobile Comments, at 5-6 (“Maximizing the availability of paired spectrum increases the likelihood of robust competition by allowing both established licensees, who are interested in expanding their geographic coverage, and new entrants, who seek to provide services to customers for the first time, to acquire all the critical spectrum needed for their business at once.”). Like T-Mobile, numerous commenters emphasized creation of paired spectrum bands over dedication of spectrum to supplemental downlink. The thrust of these comments is that the Commission should focus on including uplink and downlink capabilities in the 600 MHz band. As Sprint discusses below, a TDD band plan will better accomplish this result.

spectrum with similar propagation characteristics – that is, operators with paired 600 or 700 MHz licenses.³⁹ Rather than expanding competitive opportunities, supplemental downlink spectrum magnifies low-band concentration, depriving potential new entrants to spectrum bands below 1 GHz of opportunities to acquire spectrum suitable for uplink and downlink traffic.

C. TDD Presents the Most Attractive Method for the Commission to Achieve Its Goals

For an operator to effectively compete, “having both uplink and downlink spectrum is an obvious necessity,” MetroPCS notes.⁴⁰ While commenters largely assumed the Commission would adopt an FDD allocation, and thus paired uplink and downlink frequencies to best provide operators competitive opportunities within the 600 MHz band, Sprint continues to believe that a TDD allocation best effectuates the goal of the Commission and the majority of commenters, as well: to promote competition by providing low-band spectrum capable of supporting uplink and downlink traffic.⁴¹ Indeed, Sprint was not alone in drawing the Commission’s attention to considering a TDD-based band plan. CCA observed that, “A TDD allocation may offer more competitive opportunities and increase participation than an alternative band plan.”⁴² Alcatel-Lucent notes that, “Particularly given the uncertainty over the amount of spectrum to be made available, there is the potential for an FDD band plan to yield only limited paired spectrum and substantial unpaired downlink spectrum.” By contrast, a “TDD approach may better provide the

³⁹ Sprint Comments, at n. 18.

⁴⁰ MetroPCS Comments, at 21.

⁴¹ As Sprint previously noted, unlicensed white spaces devices can also operate in guard bands adjacent to TDD bands. Since white space devices typically operate on a TDD basis, there is a potential synergy for making higher-scale devices that are designed to operate both in the 600 MHz TDD band, as well as in television white space guard bands.

⁴² CCA Comments, at 16-17.

maximum amount of spectrum with both uplink and downlink capabilities.”⁴³ Contrary to the assertions of AT&T that “almost all LTE providers use [FDD],”⁴⁴ Alcatel-Lucent describes “renewed industry interest” in TDD.⁴⁵ Clearwire similarly cites the “increasing, global embrace of TDD-LTE as a superior technology option for data-centric networks,” noting the Global TDD-LTE Initiative of more than 31 members serving over 1 billion subscribers.⁴⁶ Moreover, contrary to the claims of Motorola Mobility that allowing TDD would “create even more challenges for manufacturers,”⁴⁷ Nokia Siemens Networks has indicated its “long-term commitment to both the FDD and TDD modes of operation for LTE.”⁴⁸ Indeed, prior to the portioning of Motorola into Motorola Solutions and Motorola Mobility, the combined company unequivocally stated that the LTE ecosystem supported the co-existence of FDD and TDD technology.⁴⁹

In contrast to the complexity associated with an FDD allocation, TDD offers significant flexibility, allowing the Commission to tailor the number of channels in a particular market to the amount of spectrum cleared. While an FDD approach could result in “an inordinate amount of downlink-only spectrum blocks being made available at auction” – a result that would frustrate competition – Alcatel-Lucent notes that the ability of TDD to “preserve downlink and

⁴³ Alcatel-Lucent Comments, at 3.

⁴⁴ AT&T Comments, at 18.

⁴⁵ Alcatel-Lucent Comments, at 3.

⁴⁶ Comments of Clearwire Corporation, GN Docket No. 12-268, at 4, 9 (filed Jan. 25, 2013).

⁴⁷ Motorola Comments, at 10.

⁴⁸ Nokia Siemens Networks Comments, at 11.

⁴⁹ Motorola, “TD-LTE: Exciting Alternative, Global Momentum,” White Paper (2010), *available at* http://www.motorola.com/web/Business/Solutions/Industry%20Solutions/Service%20Providers/Network%20Operators/_Documents/_static%20files/TD-LTE%20White%20Paper%20-%20FINAL.pdf (“Motorola White Paper”).

uplink flexibility is compelling.”⁵⁰ As Sprint described in its Comments, the flexibility associated with TDD provides for more competitive opportunities within the 600 MHz band, eliminating the “exposure” problem of a carrier winning only an unpaired downlink block, and providing the greatest amount of “bi-directional” spectrum.

In addition to offering significantly more bi-directional spectrum than an FDD alternative, a TDD band plan also allows operators to better address the asymmetrical traffic demands of users. With downlink traffic currently significantly outstripping uplink traffic, an FDD allocation provides for a less spectrally efficient use of the spectrum – with less traffic in the downlink direction per megahertz than TDD. Contrary to the assertions of Verizon Wireless, TDD operation would not reduce the amount of auctionable spectrum by requiring guard bands between the licensed blocks.⁵¹ As Sprint noted in its Comments, operators would adopt common asymmetry ratios and synchronize transmissions.⁵² This is neither difficult,⁵³ nor unusual.⁵⁴

Nor should the Commission’s consideration of a TDD band plan be negatively impacted by claims of unwanted harmonic effects.⁵⁵ While there is truth to the mathematical possibility of unwanted interference from third, fourth and even fifth order harmonics, virtually any frequency in use today, divided by 2, 3, 4, or 5, corresponds to a core wireless frequency currently used by

⁵⁰ Alcatel-Lucent Comments, at 11-12.

⁵¹ Verizon Wireless Comments, at 17.

⁵² Sprint Comments, at 24.

⁵³ Motorola White Paper, at 7.

⁵⁴ In 2008, Sprint Nextel, Clearwire, Xanadoo, and Globalstar adopted a WiMAX TDD 2.5 GHz band synchronization plan, which had been developed by the Wireless Communications Association International. These parties committed to using GPS-locked synchronization and signaling periods of 29 symbols downstream and 18 symbols upstream. That asymmetry ratio and synchronization agreement remains in effect today, some 5 years later. Operators agreed to revisit that asymmetry ratio as needed.

⁵⁵ Qualcomm Comments, at 15.

a wireless service. For instance, the 700 MHz band has channel allocations that, when multiplied by two, fall into the GPS band – but in that case the Commission has adopted reasonable out-of-band emissions limits. Industry has gone even further by designing devices that adequately suppress 700 MHz harmonics to a level that permits a GPS receiver to function within the same device. Similarly, Sprint Nextel was able to resolve third-order harmonic problems with Qualcomm’s former MediaFlo service, once located on the lower 700 MHz D Block (716-722 MHz). In this case, the third harmonic arose in the former Multipoint Distribution Service channel MDS-1 (2150-2156 MHz), which at the time was used for uplink communications. Sprint Nextel, working with Qualcomm, resolved the issue through cooperation and better technology. With little additional low-band spectrum available, neither industry nor the Commission should preclude spectrally efficient, pro-competitive solutions simply because of harmonic issues that invite practical, technical solutions.

IV. CONCLUSION

Sprint looks forward to the opportunity to work closely with the Commission to implement auction rules and a band plan that maximize competition, promote innovation, and unleash new technologies. As Sprint has emphasized, the 600 MHz band represents that last remaining spectrum below 1 GHz for licensed wireless broadband, and as a consequence merits competitive scrutiny by the Commission in the design of auction rules and the formulation of a band plan. Rather than depressing participation and revenue, targeted pro-competitive rules by the Commission can broaden auction participation, resulting in more revenue than an open eligibility auction might otherwise produce. In both its auction rules and band plan, the Commission has the opportunity to strengthen competition, stimulate revenue for the NPSBN,

and unleash significantly more innovation and new opportunities for more operators in spectrum below 1 GHz.

Why Restricting Participation in Spectrum Auctions Can Increase Bidder Participation, Increase
Auction Revenues, and Increase Competition in Wireless Markets

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Verizon's and AT&T's Comments Fail to Recognize that Auctions Designed Without Attention to Post-Auction Competition Can Limit Participation, Reduce Auction Revenues, and Lead to Excessive Post-Auction Concentration

Verizon has stated in its Comments that “the Commission should design the forward auction to promote maximum participation by wireless providers.”¹ Similarly, AT&T has argued that “the Commission should reject proposals to impose *ex ante* limits on the spectrum that particular carriers can obtain through this auction.”² The general proposition that encouraging participation by wireless providers in the forward auction should be an important consideration in setting the rules and designing the structure of the upcoming incentive auction is uncontroversial. However, Verizon’s recommendation that “the forward auction and 600 MHz service rules should impose no eligibility or spectrum aggregation restrictions”³ and AT&T’s recommendation that “to reduce the risk of auction failure, the Commission should not constrain the participation of particular carriers in the forward auction,”⁴ are controversial. Both we and many economists with expertise in auction design disagree with their recommendations. Moreover, Verizon’s and AT&T’s recommendations are contradicted by the experiences in previous spectrum auctions.

There are five main reasons for our disagreement. First, economic theory shows that unrestricted auctions actually can limit total bidder participation, reduce auction revenues, and lead to excessive concentration in the supply of wireless services. Second, the experiences in previous spectrum auctions demonstrate that well-designed bidding restrictions such as set-asides and spectrum caps often can improve the outcomes of spectrum auctions.⁵ Third, the outcome of

¹ Comments of Verizon and Verizon Wireless, *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Federal Communications Commission Docket No. 12-268, p. 38 (filed Jan. 25, 2013) (hereafter, Verizon Comments).

² Comments of AT&T Inc., *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Federal Communications Commission Docket No. 12-268, p. 79 (filed Jan. 25, 2013) (hereafter, AT&T Comments).

³ Verizon Comments, p. 38. Specifically, Verizon states that “Section 6404 of the Spectrum Act provides that the Commission cannot ‘prevent a person from participating in a system of competitive bidding’ if that person complies with the Commission’s auction rules and meets the technical, financial, character and citizenship qualifications. That requirement is consistent with the Commission’s repeated finding that open eligibility for wireless spectrum allocations serves the public interest and is clearly the most efficient means for licensing spectrum by auction. Allowing all interested parties to participate fully in the forward auction without limits on that participation is not only statutorily mandated, but it will ensure that the 600 MHz spectrum is put to its highest and best use, as required by Section 309(j).” Verizon Comments, pp. 38-39.

⁴ AT&T Comments, p. 79.

⁵ There are basically three types of policies that the economics literature has identified as leading to possible improvements in the outcomes of auctions. *Set-asides* specify some spectrum blocks as open for bidding only by certain types of entities or, equivalently, prevent bidding for these blocks by certain types of entities. *Spectrum caps* limit the total amount of spectrum that any bidder can acquire in an auction,

unrestricted spectrum auctions can lead to excessive concentration in downstream wireless markets and thereby lead to less competition in those markets. Fourth, it may not be feasible – or economically efficient – to undo such adverse effects on competition after the auction has occurred. Fifth, the design of the auction, particularly the bidding eligibility rules, is especially important here because the outcome of the forward auction will affect both the amount of spectrum made available by broadcasters for use by wireless carriers and competition in wireless markets. Thus, Verizon’s and AT&T’s arguments prove too much. The very open eligibility they advocate for encouraging participation (and thereby increasing revenue) has the potential effect of *detering* participation and *reducing* revenue, as well as leading to less wireless competition than would an auction with restrictions.

In this Declaration, we elaborate on these points.

1. Recommendations that the Commission should not impose any eligibility or spectrum aggregation restrictions on wireless providers are not supported by the economics literature on optimal auction design.

A fundamental concern in any auction is how the structure of the auction will affect the number of entities that bid. Economic theory has shown that unrestricted auctions can discourage some potential bidders and lead to the result that auction revenues fall far short of expectations. By contrast, properly designed spectrum auctions, including those featuring targeted limitations on participation, can have a positive effect on overall participation and revenue. For example, Susan Athey and her co-authors present an illustrative example in which “if bidding is costly and firms are heterogeneous...restricting participation may increase auction revenue.”⁶

These types of results are widely known. For example, Michael Katz notes that “[t]here are theoretical situations in which the introduction of additional bidders to an auction can lower the expected value of the winning bid. In particular, if one firm is known by all market participants to have the highest value of the object being auctioned and to be very well-informed about its value, then other firms may be reluctant to participate in an auction that includes that firm as a bidder because outbidding that firm is likely to lead paying more for the object than its

taking into account its pre-auction holdings. *Subsidies*, or *bidding credits*, permit certain types of entities to win an auction even if theirs are not the highest bids. Each of these has been employed at one time or another in various spectrum auctions in order to attempt to increase auction revenues and enhance post-auction competition.

⁶ Susan Athey, Dominic Coey and Jonathan Levin, “Set-Asides and Subsidies in Auctions,” *American Economic Journal: Microeconomics* 5 (2013), p. 2.

value to the winner.”⁷ Although Katz states that he is “unaware of any evidence that these conditions apply to the spectrum auctions under consideration,”⁸ he also does not deny the possibility that limiting bidder participation can, under some circumstances, raise the value of the winning bid.

Optimal auction design in large part involves attracting an appropriate number of auction participants. Paul Klemperer, “the principal auction theorist advising the UK government’s Radiocommunications Agency, which designed and ran the U.K mobile-phone license auction”, has observed that a “major area of concern of practical auction design is to attract bidders, since an auction with too few bidders risks being unprofitable for the auctioneer...and potentially inefficient. Ascending auctions are often particularly poor in this respect, since they allow some bidders to deter the entry, or depress the bidding, of rivals.”⁹ In other words, while poorly-designed limitations on participation can reduce auction revenue (as Verizon and AT&T assert), failure to include well-designed bidding restrictions – most notably those that would restrict conduct by large bidders that would discourage other bidders – can reduce participation and result in lower revenues.

Klemperer also makes the important point that “the most obvious possible distortion is that since firms’ joint profits in a market are generally greater if fewer competitors are in the market, it is worth more to any group of firms to prevent entry of an additional firm than the additional firm is willing to pay to enter. As a result, too few firms may win a share of spectrum, and these winners may each win too much...Thus, it may sometimes be wiser to predetermine the number of winners by auctioning off fewer larger licenses, but limiting bidders to one license apiece, rather than to auction many licenses and to allow bidders to buy as many as they wish...”¹⁰

To see how this type of “incumbent bias” can occur, consider a hypothetical market in which a monopolist is earning monopoly profits of \$200. Suppose that the Commission holds an auction for a second license. If the incumbent monopolist wins the auction, it will be able to maintain its monopoly power and continue to earn \$200 in monopoly profits. If instead an equally efficient entrant wins the auction, the incumbent and the entrant will compete in the

⁷ Michael Katz, “An Economic Analysis of Auction Set-Asides,” http://www.gcbpp.org/files/Academic_Papers/AP_Katz_AuctionSet.pdf, footnote 18. See also Jeremy Bulow and Paul Klemperer, “Prices and the Winner’s Curse,” *Rand Journal of Economics* 33 (2002), pp. 1-21, who show that restricting participation can be beneficial if there are strong winner’s curse effects.

⁸ Katz, *Ibid.*

⁹ Paul Klemperer, “What Really Matters in Auction Design,” *The Journal of Economic Perspectives* 16 (2002), p. 172.

¹⁰ *Ibid.* pp. 177-178.

downstream market and each will earn a (duopoly) profit of (say) \$70.¹¹ It follows that the entrant would be willing to pay up to \$70 for the license, whereas the incumbent would be willing to pay up to \$130 (i.e., \$200 - \$70). More generally, as long as entry would reduce total industry profits in the downstream market, the incumbent would have an incentive to bid more for the license than would the entrant. Therefore, absent any restrictions, the incumbent would win the auction and maintain its monopoly position in the downstream market. If the entrant were to anticipate this outcome, it may decide not to participate in the auction in order to save the costs that it would incur by participating. In this case, not only would the incumbent maintain its monopoly position, but it would also have to pay less for the license – indeed, potentially far less than it would otherwise bid for the license in the presence of competition from other bidders.

A similar bias can exist in markets where there are smaller competitors rather than potential entrants while other firms are large and have market power in the downstream market.¹² In this case, if one of these firms wins the auction, it might become even larger and increase its market power. If instead the license goes to a smaller firm, the downstream market may become more competitive. Again, these anticipated post-auction effects in the downstream market can raise the willingness of the largest firms to bid higher and discourage smaller firms from participating in the auction.

Verizon ignores these potential effects when it claims that “restricting bidders from acquiring the spectrum they need to serve their customers would harm competition and consumers because at least some portion of the available spectrum would likely go to providers other than those that value it most and are most likely to deploy it productively.”¹³ Similarly, AT&T ignores these effects when it argues that “if the Commission adopted rules that would limit the participation of well-capitalized market actors...it would sabotage forward-auction competition....”¹⁴ As the economics literature makes clear, a firm with market power may win

¹¹ The total profits of the two firms in the downstream market would be equal to \$140, and thus would be smaller than the monopoly profit of \$200. This negative impact of entry on total industry profits—and hence the incumbent bias—requires that the entrant produces a sufficiently close substitute for the incumbent’s product.

¹² Although the literature often distinguishes between “incumbents” and “entrants,” the same analysis applies when the entities are “large” and “small” incumbents. Thus, just as incumbents have an incentive to discourage entrants, for many of the same reasons, large incumbents also have an incentive to prevent the growth of smaller ones. For that reason, some writers instead distinguish between “strong” and “weak” bidders. Ian Ayres and Peter Cramton, “Deficit Reduction Through Diversity: How Affirmative Action at the FCC Increased Auction Competition,” *Stanford Law Review* 48 (1996), p. 766, also use the “strong-weak” terminology.

¹³ Verizon Comments, p. 41.

¹⁴ AT&T Comments, p. 79.

the license even if it is more beneficial for an entrant to obtain the license, both with respect to the auction revenues that are raised and the nature of post-auction competition.

2. *Recommendations to the Commission that there should be no eligibility or spectrum aggregation restrictions placed on wireless providers are not supported by the available evidence from past spectrum auctions.*

The evidence available from past spectrum auctions concretely demonstrates the benefits that bidding restrictions can have on the number of bidders, the revenues generated by the auction, and the number of competitors in the downstream market for wireless services.

For example, in commenting on the 2000 UK spectrum auction, Paul Klemperer has observed that “[b]ecause no bidder was permitted to win more than one license and licenses could not be divided, there was no simple way [for bidders] to share the spoils, so ‘tacit’ collusion would be hard. *Even more important*, the fact that at least one license had to go to a new entrant was a sufficient carrot to attract new entrants.”¹⁵

By contrast, Klemperer points out that, in the Netherlands, the fact that there were the same number of incumbents as licenses to be auctioned “created exactly the situation in which it could be predicted that very few entrants would bother to show up to an ascending auction.... The result was that the auction raised less than 3 billion Euros rather than the almost 10 billion Euros the Dutch government had forecast based on the UK experience.”¹⁶ Apparently based on this experience, the Dutch government decided to reserve two licenses for “newcomers” in its most recent spectrum auction.¹⁷ In explaining the outcome of the auction, one analyst has noted that “The high prices in the Netherlands were caused by the government setting aside some of

¹⁵ Paul Klemperer, “How (Not) to Run Auctions: the European 3G Telecom Auctions,” *European Economic Review* 46 (2002), p. 832 (emphasis added). Klemperer’s “tacit collusion” point suggests that set asides or spectrum caps can lead to higher auction revenues by forcing AT&T and Verizon to bid more aggressively against one another if the amount of spectrum for which they are eligible to bid is limited.

¹⁶ Ibid. pp. 832-833 (footnote omitted). Peter Cramton, “Spectrum Auctions” in Martin E. Cave, Sumit K. Majumdar, and Ingo Vogelsang, *Handbook of Telecommunications Economics*, Volume 1, Amsterdam, Elsevier, 2002, p. 629, makes the same point: “In the UK, the guaranteed success of at least one new entrant encouraged participation in the auction. In the Netherlands, with five incumbents bidding for five licenses, the logical outcome is for the five incumbents to win licenses. Recognising the difficulty of winning a license, potential entrants have strong incentives to partner with the incumbent bidders. This is exactly what happened.”

¹⁷ Regulation of the Dutch Ministry of Economic Affairs, Agriculture and Innovation dated January 6th, 2012, no. WJZ/10146523, to establish the application and auction procedure for licences for the frequency spectrum in the 800, 900 and 1800 MHz bands for mobile communication applications (Regulation regarding the application and auction procedure for 800, 900 and 1800 MHz licences), Complimentary English translation, 10th July 2012, Explanatory Notes, 2.1 and 2.2.

the most valuable 800MHz spectrum for a fourth operator. This created a squeeze which drove up prices.”¹⁸

Klemperer also observes the following lesson from the Italian auction: “[F]irms had learned from the earlier auctions who were the strongest bidders, and hence the likely winner, at least in an ascending auction. So weak bidders would not show up or would bid jointly in such an auction...and the number of entrants would be much lower than the 13 who had entered the UK auction.”¹⁹

These experiences, and others recounted by Klemperer, make clear that the way in which an auction is structured can have significant effects on the number of bidders, the revenues that are generated by an auction, and the number and strength of competitors in the downstream market for wireless services.

In a recent Statement, the UK’s Ofcom has also addressed these issues: “We decided that we should reserve some spectrum in the auction. We considered the position of the existing national wholesalers in the UK market, and concluded that there was a material risk that neither H3G nor a new entrant would acquire a sufficient amount of spectrum in the auction to be able to compete credibly at the wholesale level in the future. We considered whether any of the other existing national wholesalers might not acquire sufficient spectrum in the auction to be able to compete credibly at the wholesale level in the future, and decided that we did not have the same level of concern in regard to Everything Everywhere, Telefónica or Vodafone, even though they may well be able to offer better or a wider range of services and compete more aggressively if they acquire additional spectrum through the auction. We therefore decided that it was appropriate to reserve some of the available spectrum in the auction for a fourth national wholesaler, by which we mean a bidder other than Everything Everywhere, Telefónica or Vodafone.”²⁰

In addition to reserving some spectrum for smaller competitors and new entrants, Ofcom also imposed a cap on the amount of spectrum that any bidder could obtain in the auctions. In doing so, Ofcom noted that “we considered these particular caps to be the minimum necessary to

¹⁸ Netherlands 4G Spectrum Sale Price Raises Hopes for UK Auction, <http://mobilemarketingmagazine.com/content/netherlands-4g-spectrum-sales-price-raises-hopes-uk-auction>.

¹⁹ Klemperer, *supra* note 15, p. 834.

²⁰ Ofcom, “Statement on the making of regulations in connection with the award of the 800 MHz and 2.6 GHz spectrum bands” (12 November 2012), Section A2.17.

avoid very asymmetric distributions of spectrum, taking account of existing spectrum holdings.”²¹

3. The outcome of unrestricted spectrum auctions can lead to excessive concentration in downstream wireless markets.

The structure of a spectrum auction also can affect the extent and nature of competition in downstream wireless markets. This issue takes on special concern here because of the dominance of Verizon and AT&T in these markets. As discussed above, AT&T and Verizon have incentives to take into account the effect of their behavior on the extent to which competitors will enter and provide additional downstream competition. Because smaller competitors are likely to recognize these incentives, they may reduce their participation. If so, the result will be that auction revenues will be reduced and downstream competition will be less vigorous. As the Commission and Department of Justice have routinely observed, less downstream competition can have harmful effects on prices, innovation, and consumer welfare.

Verizon has claimed that “any restriction could not be justified” as “the strong and increasing competition in the market for mobile broadband” shows that “there is no indication that competitive harm would develop for services provided using 600 MHz spectrum.”²² It goes on to observe that “97 percent of the U.S. population already lives in census tracts with access to three or more different operators offering mobile telephone service.”²³ However, the fact that there might be three or more operators in any given area does not imply that the outcome of the auction is irrelevant to the intensity of competition in that area. Because Verizon and AT&T dominate most markets, wireless competition would be increased if one of the smaller firms won the license (or licenses) instead.

4. Verizon’s and AT&T’s suggestions that any excessive concentration in spectrum holdings that may result from the auction should be remedied by allowing them to divest the spectrum holdings of their choosing after the auction is inconsistent with the basic premise of the combinatorial spectrum auction.

The Commission has requested comments on whether to adopt a rule of “general applicability” to promote “economic opportunity and competition” and to ensure that “new and

²¹ Ibid. Section A2.22.

²² Verizon Comments, p. 40.

²³ Ibid.

innovative technologies are readily accessible to the American people by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants...”²⁴

Verizon has argued that “If divestitures are required as a result of spectrum acquired in the auction, the only appropriate mechanism would be for the affected companies to bring themselves into compliance with any generally applicable rule on a post-auction basis.”²⁵ Similarly, AT&T has argued that “if a winning bidder’s acquisition of new spectrum would bring its total holdings in a market to a level that is determined to threaten competition, that licensee should be free to choose which spectrum it will divest to remedy the anticompetitive harm.”²⁶

These recommendations for using an ex-post spectrum cap to resolve problems that are created by the outcome of an unrestricted auction ignore several important facts. First, they ignore the fact that a licensee would have strong incentives to divest spectrum that would have the least value to its rivals.²⁷ Second, they ignore the fact that, absent strong intervention by the regulator, a firm that is required to divest assets is likely to price them above their market value or engage in negotiating tactics that delay access to spectrum by its competitors.

Finally, and most fundamentally, they ignore the fact that the basic rationale for the *combinatorial* spectrum auctions that the Commission has employed. This rationale is that the value of any spectrum license to its holder depends importantly on its other spectrum holdings. A spectrum license may have little value if its holder either does not have other complementary holdings or if it has other holdings that are very good substitutes for the license.²⁸ For this reason, the Commission has organized its spectrum auctions in a way that takes into account these interdependencies. If it were easy for these interdependencies to be taken into account *after* an auction, there would be no need to design the auction in a way that allows bidders to take these synergies into account *during* the auction. For the same reason, remedying the

²⁴ 47 U.S.C. § 309(j)(3)(B).

²⁵ Verizon Comments, p. 43.

²⁶ AT&T Comments, p. 79.

²⁷ The Antitrust Division of the Department of Justice has indicated that, where it requires divestitures in order to allow a merger to be consummated, it must approve both the identity of the purchaser and the assets to be divested. Thus, it presumably would not agree with AT&T that the licensee should be free to choose which spectrum it will divest to remedy the anticompetitive harm. *See* U.S. Department of Justice, Antitrust Division Policy Guide to Merger Remedies (June 2011), pp. 7-12, for a discussion of the factors that affect the Division’s consideration of divestiture remedies.

²⁸ These interdependencies can be geographic, where the value of a license in one area depends on the licensee’s holdings in other areas, or frequency-related, where the value of a license in one spectrum band depends on the licensee’s holdings in other bands. *See* Yeon-Koon Che, Phil Haile, and Michael Kearns, “Design of the FCC Incentive Auctions” (January 25, 2013), pp. 7-9 for a discussion of these complementarities.

anticompetitive effects of excessive spectrum holdings *after* an auction is unlikely to be a good substitute for taking them into account *during* the auction design. The Commission has chosen to employ combinatorial auctions because the transactions costs of assembling efficient spectrum holdings after the auctions have been completed would be considerable.²⁹

5. The fact that the FCC Incentive Auction is a novel mechanism involving both TV broadcasters and wireless carriers does not invalidate the lessons learned from past spectrum auctions and does not diminish the importance of designing the auction rules very carefully.

Verizon and AT&T have argued that imposing eligibility requirements would run the risk of causing the incentive auction to fail. For example, AT&T has argued that “if the Commission adopted rules that would limit the participation of well-capitalized market actors in this auction, it would sabotage forward auction competition and undermine prospects for obtaining the bid levels needed to meet the statutory closing conditions for any given channel-clearing target.”³⁰ Similarly, Verizon has argued that “rules restricting bidding would artificially suppress demand for the 600 MHz spectrum and risk not meeting the closing conditions and Congress’s other fiscal goals for the auction.”³¹

It is the case that this incentive auction will differ from previous spectrum auctions. In particular, there will be both a *reverse auction* in which TV broadcasters will bid to supply spectrum and a *forward auction* in which wireless service providers will bid to obtain spectrum licenses. As Verizon has noted, “achieving the Spectrum Act’s revenue objectives depends on maximizing the incentives of both wireless providers and broadcasters to enter the auction and to vigorously participate.... [W]ireless providers are more likely to participate if there is certainty about what they are bidding for and there is a sufficient amount of spectrum available, while broadcasters are likely to participate only to the extent they perceive that demand for cleared spectrum will be sufficiently robust to make their participation worthwhile.”³² Similarly, the Telecommunications Industry Association has noted: “Meeting the Commission’s goal of ‘encourag[ing] widespread participation in the reverse auction by broadcast television licenses’ is necessarily related to the revenues via the forward auction. Robust competition among bidders for the newly available frequencies is the only source of funding available to encourage TV

²⁹ This is not to say that efficient after-market transactions cannot occur, but only that the costs of such transactions should be avoided where possible.

³⁰ AT&T Comments, p. 79.

³¹ Verizon Comments, pp. 41-42.

³² Ibid. p. 4.

licensees to exit the business, cover repacking and administrative costs, and contribute to the build-out of the nationwide public safety network.”³³

We have already explained how eligibility limits can actually *increase* the value of bids and how experience in a number of spectrum auctions indicates that this is not merely a theoretical possibility. Indeed, well-designed limitations on eligibility – for instance through set-asides – may better promote participation (and hence generate more revenues) in the forward auction than an open eligibility standard. If the presence of AT&T and Verizon as the two dominant bidders discourages participation in the auction by smaller rivals and entrants, AT&T and Verizon may be able to win the auction and obtain additional spectrum even while paying low prices.

These effects also can reduce the amount of spectrum being auctioned since low winning bids may not be sufficient to bring forth a large amount of spectrum from TV broadcasters. Moreover, even if this is the result, AT&T and Verizon would have succeeded in denying rivals access to additional spectrum. By contrast, eligibility restrictions can provide the weaker rivals with greater incentives to bid, with the result that the winning bids may be higher. In that case, a greater amount of additional spectrum would be forthcoming from broadcasters than if eligibility restrictions had not been imposed, and the downstream market would become less concentrated.

* * *

To summarize, contrary to claims by AT&T, Verizon, and others, well-designed bidding restrictions such as set-asides and spectrum caps can improve the outcomes of spectrum auctions. They can increase bidder participation, increase auction revenues, and reduce downstream concentration. Although this result is not present in every case, the problem of “incumbent bias” increases the likelihood that bidding restrictions will have a salutary effect in the upcoming 600 MHz auctions. Moreover, for precisely the same reason that the Commission has chosen to employ combinatorial auctions, competition concerns should be dealt with *during* the auctions rather than *after* they have taken place. Finally, the novelty of these auctions -- the fact that there will be both reverse and forward auctions -- makes it especially important that bidder participation and auction revenues are taken into account in their design.

³³ Comments of the Telecommunications Industry Association, *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Federal Communications Commission Docket No. 12-268 (filed Jan. 25, 2013), p. 16 (footnote omitted). These Comments go on to say that “In contrast, an auction design that would limit bidder eligibility in the forward auction and/or reduce revenue may lead to an unsatisfactory outcome that fails the requirements of the Spectrum Act.....” (Ibid., pp. 16-17) (footnote omitted))